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Hideki Nakahara

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EXAMINER

HUANG, DAVID S

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/569,491	<b>Applicant(s)</b> NAKAHARA ET AL.	
	<b>Examiner</b> DAVID HUANG	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 10, 12 and 14-25 is/are rejected.
- 7) ☒ Claim(s) 7, 9, 11 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/27/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

2. The references listed in the Information Disclosure Statement(s) filed on 2/27/2006 have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).

### *Claim Objections*

3. **Claims 1-20** are objected to because of the following informalities:

**Claim 1, lines 9-11**, "a timing obtained by delaying a reference timing to be a reference for the signal transmission by a predetermined delay amount" is awkwardly phrased. It is suggested to applicant to remove "to be a reference" to clarify the limitation.

**Claim 3, line 8**, "a signal to be transmitted to the receiving station" should be --*the* signal to be transmitted to the receiving station-- since antecedent basis is already established for this limitation in line 5 of the claim.

**Claim 6, line 8**, "a signal to be transmitted" should be --*the* signal to be transmitted-- since antecedent basis is already established for this limitation in line 5 of the claim.

**Claim 7, line 9**, "a signal to be transmitted" should be --*the* signal to be transmitted-- since antecedent basis is already established for this limitation in line 5 of the claim.

**Claim 20**, line 2, recites "PSK-VP" scheme is an acronym that is not defined in the claim. The expanded form of the acronym should be added to claim for improved clarity.

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Claim not specifically mentioned are dependent on the above objected claims, and are similarly objected.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 2, 3, 5, 6, 8, 10, 12, 14, 21, 22, 24, and 25** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 2, line 4** recites "the wireless station," but it is unclear to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

**Claim 3, line 10** recites "the wireless station," but it is unclear to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

**Claim 5, line 2** recites "the timing detection section." There is insufficient antecedent basis for this limitation in the claim. Neither claims 1 nor 3, on which claim 5 depend, establish antecedent for a "timing detection section". However, claim 4 recites a timing detection section. For examination on the merits, claim 5 will be interpreted as being dependent on claim 4.

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**Claim 6, lines 25-26** recite "a signal transmitted by the transmitter signal transmitting section," but it is unclear if this is a new limitation or if it refers to the "signal to be transmitted to the receiving station" recited in lines 5 and 8. For examination on the merits, this limitation will be understood to be the "signal to be transmitted to the receiving station." It is sufficient to change the limitation of lines 25-26 to "the signal transmitted by the transmitter signal transmitting section."

**Claim 8, lines 10-11** recite "a signal transmitted to each wireless station," but it is unclear whether this is some new limitation or the "signal to be transmitted to the receiving station" of lines 4-5. For examination on the merits, the limitation will be understood to be the signal to be transmitted to the receiving station, which is transmitted to the wireless stations, as in lines 4-5 of the claim.

**Claim 8, lines 16-17** recite "the wireless station," but it is unclear to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

**Claim 21, line 5** recites "the wireless station," but it is unclear as to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

**Claim 22, line 16** recites "the wireless station," but it is unclear as to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless

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station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

**Claim 24, line 3** recites "a signal from each wireless station," but this it is unclear if this limitation refers to the signal in line 2 or to some other limitation. For examination on the merits, "for transmitting a signal from each wireless station," in lines 3-4 will be understood to be redundant to lines 1-3, and ignored.

**Claim 25, lines 7-8** recite "a signal transmitted to each wireless station," but it is unclear if this limitation refers to the signal in line 1 or to some other limitation. For examination on the merits, the limitation of lines 7-8 will be understood to the signal of line 1 since line 2 indicates that it is transmitted to the receiving station via the wireless stations.

**Claim 25, line 14** recites "the wireless station," but it is unclear as to which wireless station this limitation refers: the plurality of wireless stations, the transmitter-side wireless station, or some other wireless station. For examination on the merits, the limitation will be interpreted as best understood.

Claims not specifically mentioned are dependent on the above rejected claims and are similarly rejected.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re*

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*Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. **Claims 1 and 18** provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 15 of copending Application No. 10/569,730.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 15 discloses all the limitations of claims 1 and 18 of the present application.

Regarding **claim 1**, Claim 15 of 10/569,730 discloses a wireless transmission system in which a plurality of wireless stations each transmit a signal to a receiving station, wherein a path diversity system is formed by a transmitter-side wireless station, a multi-path channel and the receiving station, the wireless transmission system comprising:

a transmission timing control section for determining a transmission start timing, at which to start the signal transmission, to be a timing obtained by delaying a reference timing to be a reference for the signal transmission by a predetermined delay amount (claim 14, lines 8-11);

a transmitting section for transmitting the signal at the transmission start timing determined by the transmission timing control section (claim 14, lines 12-13); and

a receiving section provided in the receiving station for receiving the transmitted signal (claim 15, lines 1-2),

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wherein the predetermined delay amount is determined so that: signals are received by the receiving section at a plurality of signal-receiving timings; the number of signal-receiving timings is less than or equal to a predetermined maximum number of effective branches; a difference between the signal-receiving timings is greater than or equal to a predetermined delay resolution; and a difference between a maximum value and a minimum value of the signal-receiving timing is less than or equal to a predetermined maximum delay (claim 14, lines 14-20).

Regarding **claim 18**, Claim 15 of application 10/569,730 discloses the wireless transmission system further comprises a delay amount selecting section for randomly selecting the predetermined delay amount from among a plurality of candidate values (claim 14, lines 5-7); and

the transmission timing control section determines the transmission start timing based on the delay amount selected by the delay amount selecting section (claim 14, lines 8-11).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.



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9. **Claims 1, 2, 16, 21, 23, and 24** are rejected under 35 U.S.C. 102(b) as being anticipated by Raven (GB 1,576,347 - cited in IDS).

Regarding **claims 1, 21, 23, and 24**, Raven discloses a wireless transmission system in which a plurality of wireless stations (fig. 2, repeater stations 40, 41, 42) each transmit a signal to a receiving station (fig. 2, base station 46), wherein a path diversity system is formed by a transmitter-side wireless station (fig. 2, mobile transmitter 45), a multi-path channel and the receiving station, the wireless transmission system comprising:

a transmission timing control section for determining a transmission start timing, at which to start the signal transmission, to be a timing obtained by delaying a reference timing to be a reference for the signal transmission by a predetermined delay amount (page 4, lines 20-23; fig. 2, delay unit 47; there is an inherent timing that exists before and after each delay unit, such that a "reference timing" exists before the delay unit, and the timing after the delay is the transmission start timing);

a transmitting section for transmitting the signal at the transmission start timing determined by the transmission timing control section (page 4, lines 20-23; fig. 2, transmitter 44); and

a receiving section provided in the receiving station for receiving the transmitted signal (fig. 2, implicit feature of base station 46),

wherein the predetermined delay amount is determined so that: signals are received by the receiving section at a plurality of signal-receiving timings (page 3, lines 43-46); the number of signal-receiving timings is less than or equal to a predetermined maximum number of effective branches (e.g. maximum number of repeaters); a difference between the signal-

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receiving timings is greater than or equal to a predetermined delay resolution (page 2, lines 3-12); and a difference between a maximum value and a minimum value of the signal-receiving timing is less than or equal to a predetermined maximum delay (page 2, lines 13-17).

Regarding **claim 2**, Raven discloses everything applied to claim 1, and further discloses the predetermined maximum number of effective branches (three or more spaced apart transmitters, page 2, lines 34-40), the predetermined delay resolution (page 3, lines 55-60) and the predetermined maximum delay (page 3, lines 50-54) are set to values such that a plurality of delayed waves can be received with path diversity (page 2, lines 47-57, common information from spaced apart transmitters; page 3, lines 27-47, interference in overlap regions are compensated for by the delays).

Regarding **claim 16**, Raven discloses everything applied to claim 1, and further discloses the number of predetermined delay amounts is two (Fig. 2, shows signals relayed through two repeaters, 40 and 41, each with different respective delays T1 and T2).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 3 and 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS).

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Regarding **claim 3**, Raven discloses the transmission timing control section and the transmitting section are provided in the wireless station (page 4, lines 20-23; fig. 2, delay unit 47).

However, Raven fails to expressly disclose the reference timing stored in each wireless station is a predetermined timing, and the wireless stations store the same reference timing.

Nevertheless, Raven discloses in fig. 1 such that 3 spaced apart transmitters are arranged to receive the same information over links 14, 15, and 16, modulate and transmit them (page 3, lines 11-14, fig. 1). Control point 13 with information signal generator 28 supplies the signal to three delay units 29, 30 and 31, which supply delayed signal to respective transmitters (page 3, lines 39-46). Thus, there is a common reference timing in control point 13 prior to the delay elements and links 14-16.

Raven discloses the claimed invention expect for the reference timing stored in each wireless station is a predetermined timing, and the wireless stations store the same reference timing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to relocate the delay elements to be at the spaced apart transmitters after links 14-16 such that a common reference timing would be present in each of the spaced apart transmitters, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

**Regarding claim 19**, Raven discloses everything applied to claim 1, but fails to expressly disclose an orthogonal frequency division multiplexing scheme is used as the modulation scheme and the demodulation scheme.

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Examiner takes official notice that OFDM is a well known modulation and demodulation scheme that one of ordinary skill in the art of wireless communications would have been able to implement in the system disclosed by Raven.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of Raven with an OFDM modulation and demodulation scheme since OFDM is well known in the art.

12. **Claims 4 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS) in view of Rowitch (US 2004/0266338).

Regarding **claim 4**, Raven discloses everything applied to claim 1, and further discloses the wireless transmission system further comprises

a transmitting station (mobile transmitter 45, Fig. 2) for transmitting, to the wireless stations, a signal to be transmitted to the receiving station (page 4, lines 11-13);

the transmitting station includes a transmitter signal transmitting section for transmitting, to the wireless stations, a signal to be transmitted to the receiving station (mobile transmitter 45, page 4, lines 11-13; transmitting section implicit in a transmitter);

the transmission timing control section and the transmitting section are provided in the wireless station (delay unit 47, transmitter 44 in repeater station 40, Fig. 2);

the wireless station includes:

a relay receiving section for receiving a signal transmitted by the transmitter signal transmitting section (receiver 43, Fig. 2); and

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the transmitting section transmits a signal received by the relay receiving section to the receiving station (transmitter 44, Fig. 2, page 4, lines 11-13).

However, Raven fails to expressly disclose a timing detection section for detecting a timing at which the signal is received by the relay receiving section; and

the transmission timing control section determines the reference timing to be the timing detected by the timing detection section.

While Raven does not explicitly disclose detecting a timing at which the signal is received by the relay receiving section, there is an implicit timing when the signal is received, and is the reference point in time of the received signal that is delayed by delay unit 47, when the received signal is delayed.

Rowitch discloses a repeater which employs a differential delay modulator to transmit an on-time and a delayed version of the received signal. The repeater introduces path diversity between on-time and delayed versions and wirelessly transmits both. The delayed version can be generated using a fixed delay or a variable delay (page 1, [0012], page 2, [0015]). Rowitch discloses differential delay modulator DDM 250 with signal splitter 302. The first output of the splitter has no delay, and the second output is sent to delay module 310 (page 5, [0053]-[0055], Fig. 3). Thus, the implicit timing of the received signal and the on-time signal from DDM 250, is the reference or input for the delayed output.

Therefore, it would have been obvious to one of ordinary skill in the art to provide Raven with the differential delay modulator teaching of Rowitch since both references relate to repeater stations, and the teaching of Rowitch introduces path diversity into the transmission system as well as improving adaptability using either fixed or variable delays.

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Regarding **claim 15**, Raven discloses everything applied to claim 4, and further discloses the number of predetermined delay amounts is equal to the maximum number of effective branches (3 repeaters 40, 41, 42, each with different delay units T1, T2, T3, Fig. 2, page 4, lines 20-27).

13. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS) in view of Rowitch (US 2004/0266338) as applied to claim 4 above, and further in view of Guerillot (US 4,808,008).

Regarding **claim 5**, Raven and Rowitch disclose everything applied to claim 4, but fail to expressly disclose the timing detection section detects a unique word contained in the signal.

However, it is well known in the art to determine arrival times of by recognizing synchronization words, as evidenced by Guerillot (col. 1, lines 51-54, col. 2, lines 37-40).

Therefore, it would have been obvious to one of ordinary skill in the art to provide Raven and Rowitch with the teaching of determining signal arrival time using synchronization words, since such a technique is well known in the art.

14. **Claims 17 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS) in view of Ngo et al. (US 2006/0057958).

Regarding **claim 17**, Raven discloses everything applied to claim 1, but fails to expressly disclose the wireless transmission system further comprises

a delay amount selecting section for selecting the predetermined delay amount from among a plurality of candidate values;

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the delay amount to be selected by the delay amount selecting section is determined in advance; and

the transmission timing control section determines the transmission start timing based on the delay amount selected by the delay amount selecting section.

Ngo et al. discloses a system for re-transmitting signals to a receiver by modifying signal characteristics by selectively introducing a time delay such that retransmitted signals are received substantially uncorrelated at the receiver (page 1, [0008]-[0009]). Delay characteristics of the re-transmitted signals are selected by the repeaters (page 2, [0026]). The delay of each repeater can be predefined (page 3, [0033]). Repeaters introduce a delay in retransmitting the signal (i.e. delays retransmission time).

Because both Raven and Ngo et al. disclose systems and methods for repeating/retransmitting signals from a transmitter to a receiver, it would have been obvious to one of ordinary skill in the art to substitute one technique for the other for predictable result of re-transmitting signals with selectively introduced time delays. Furthermore, it would have been obvious to one of ordinary skill in the art to modify the system of Raven with the teaching of Ngo et al. since it provides more adaptability to further reduce correlation between signals received at the receiver, improving performance.

Regarding **claim 18**, Raven discloses everything applied to claim 1, but fail to expressly disclose the wireless transmission system further comprises

a delay amount selecting section for randomly selecting the predetermined delay amount from among a plurality of candidate values; and

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the transmission timing control section determines the transmission start timing based on the delay amount selected by the delay amount selecting section.

Ngo et al. discloses a system for re-transmitting signals to a receiver by randomly assigned delay when repeaters C1-Cn retransmit signals (pages 2-3, [0027]). Repeaters introduce delay in retransmitting signals and introduces lack of correlation between signals received at the receiver such that the receiver can better distinguish between all the signals it receives from transmitter A and the repeaters (page 3, [0028], [0029]). In Random Mode, repeaters randomly change the channel profile.

Because both Raven and Ngo et al. disclose systems and methods for repeating/retransmitting signals from a transmitter to a receiver, it would have been obvious to one of ordinary skill in the art to substitute one technique for the other for predictable result of re-transmitting signals with randomly assigned time delays. Furthermore, it would have been obvious to one of ordinary skill in the art to modify the system of Raven with the teaching of Ngo et al. since it provides improves performance by ensuring the receiver can better distinguish between all the signal it receives from the transmitter and repeaters.

15. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS) in view of Takai (PSK-VP NPL - cited in IDS).

**Regarding claim 20**, Raven discloses everything applied to claim 1, but fails to expressly disclose a PSK-VP scheme is used as the modulation scheme.

However, Takai discloses the anti-multipath modulation scheme PSK-VP has excellent BER performance in multipath fading (abstract).



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Therefore, it would have been obvious to one of ordinary skill in the art to provide Raven with the PSK-VP modulation scheme taught by Takai since the modulation scheme provides excellent BER performance in multipath fading.

16. **Claims 8, 22 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Raven (GB 1,576,347 - cited in IDS) in view of Matsui et al. (US 2001/0043156).

Regarding **claim 8**, Raven discloses everything applied to claim 1, and further discloses the wireless transmission system further comprises

a transmitting station for transmitting, to the wireless stations, a signal to be transmitted to the receiving station (mobile transmitter 45, Fig. 2); and

the wireless station includes:

a relay receiving section for receiving a signal transmitted from the transmitting station (Rx 43, Fig. 2); and

a relay transmitting section for transmitting the signal received by the relay receiving section to the receiving station (Tx 44, Fig. 2).

Raven fails to expressly disclose the transmission timing control section and the transmitting section are provided in the transmitting station;

the transmitting station includes a delay amount selecting section for selecting, from among a plurality of candidate values, a delay amount to be given to a signal transmitted to each wireless station;

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the transmission timing control section determines the transmission start timing to be a timing obtained by delaying the reference timing by the delay amount selected by the delay amount selecting section; and

the transmitting section transmits the signal to the wireless station at the transmission timing.

Nevertheless, Raven discloses control point 13 includes an audio information signal generator 28 connected to 3 delay units 29, 30 and 31 which apply delays  $t_1$ ,  $t_2$ , and  $t_3$  and supply the delayed signals to respective transmitters (page 3, lines 39-46, Fig. 1; there is an inherent timing that exists before and after each delay unit, such that a "reference timing" exists before the delay unit, and the timing after the delay is the transmission start timing).

Therefore, it would have been obvious to one of ordinary skill in the art to modify Raven such that the delay occurs in the transmitter/control point 13, since such an embodiment is suggested by Fig. 1 of Raven.

However, Raven fails to expressly disclose a delay amount selecting section for selecting, from among a plurality of predetermined delay amounts, the delay amount to be given to a signal transmitted to each wireless station.

Matsui et al. discloses a transmitting-receiving station for use in radio wave diversity with prefixed adjusters for easily controlling a difference between signals from multiple antennas with predetermined values for delay time (page 1, [0012], Fig. 8). The delay prefixed-adjuster has a delay adjustment tap 24A comprising several taps connected with fixed delay elements, where it is possible to adjust a delay time by switching the connections. Thus, the delay times

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for the different antennas are adjustable (page 2, [0033], Fig. 3). Matsui et al. discloses each antenna may have a respective delay prefixed-adjuster (24 and 34, fig. 8).

Therefore, it would have been obvious to one of ordinary skill in the art to provide the system of Raven with the delay prefixed-adjuster teaching of Matsui et al. since it improves adjustability in establishing delay diversity. Furthermore, both Raven and Matsui et al. address wireless transmission using delay diversity, a common field of endeavor.

Regarding **claims 22 and 25**, Raven discloses a transmitting station for use in a wireless transmission system for transmitting a signal to a receiving station via a plurality of wireless stations, wherein a path diversity system is formed by a transmitter-side wireless station, a multi-path channel and the receiving station, the transmitting station comprising:

a transmission timing control section for determining a transmission start timing, at which to start the signal transmission, to be a timing obtained by delaying a reference timing to be a reference for the signal transmission by a delay amount (page 3, lines 39-46; fig. 1, delay units 29, 30, 31; there is an inherent timing that exists before and after each delay unit, such that a "reference timing" exists before the delay unit, and the timing after the delay is the transmission start timing);

a transmitting section for transmitting the signal to the wireless station at the transmission start timing (page 3, lines 43-46; fig. 1, transmitters 10, 11, 12),

wherein the predetermined delay amount is determined so that: signals are received by the receiver side at a plurality of signal-receiving timings (page 3, lines 43-46); the number of signal-receiving timings is less than or equal to a predetermined maximum number of effective branches (e.g. maximum number of transmitters); a difference between the signal-receiving

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timings is greater than or equal to a predetermined delay resolution (page 2, lines 3-12); and a difference between a maximum value and a minimum value of the signal-receiving timing is less than or equal to a predetermined maximum delay (page 2, lines 13-17).

However, Raven fails to expressly disclose a delay amount selecting section for selecting, from among a plurality of predetermined delay amounts, the delay amount to be given to a signal transmitted to each wireless station.

Matsui et al. discloses a transmitting-receiving station for use in radio wave diversity with prefixed adjusters for easily controlling a difference between signals from multiple antennas with predetermined values for delay time (page 1, [0012], Fig. 8). The delay prefixed-adjuster has a delay adjustment tap 24A comprising several taps connected with fixed delay elements, where it is possible to adjust a delay time by switching the connections. Thus, the delay times for the different antennas are adjustable (page 2, [0033], Fig. 3). Matsui et al. discloses each antenna may have a respective delay prefixed-adjuster (24 and 34, fig. 8).

Therefore, it would have been obvious to one of ordinary skill in the art to provide the system of Raven with the delay prefixed-adjuster teaching of Matsui et al. since it improves adjustability in establishing delay diversity. Furthermore, both Raven and Matsui et al. address wireless transmission using delay diversity, a common field of endeavor.

***Allowable Subject Matter***

17. Claims 7, 9, 11, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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18. Claims 6, 10, 12 and 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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6/3/2009

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